Use of reference tissue models for quantification of histamine H_1 receptors in human brain by using positron emission tomography and [^{11}C]doxepin

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The aim of the present study is to evaluate the validity of the simplified reference tissue model (SRTM) and of Logan graphical analysis with reference tissue (LGAR) for quantification of histamine H_1 receptors (H1Rs) by using positron emission tomography (PET) with [^{11}C]doxepin. These model-based analytic methods (SRTM and LGAR) are compared to Logan graphical analysis (LGA) and to the one-tissue model (1TM), using complete datasets obtained from 5 healthy volunteers. Since H1R concentration in the cerebellum can be regarded as negligibly small, the cerebellum was selected as the reference tissue in the present study. The comparison of binding potential (*BP*) values estimated by LGAR and 1TM showed good agreement; on the other hand, SRTM turned out to be unstable concerning parameter estimation in several regions of the brain. By including the results of noise analysis, LGAR became a reliable method for parameter estimation of [^{11}C]doxepin data in the cortical regions.

Key words: model-based analysis, histamine H_1 receptor, [^{11}C]doxepin, PET